

DRAFT for Diver Dermal Exposure and Dose-2002

Direct Contact with Contaminants in Sediment

1. Dose notes other than diver extracted from ATSDR PH-Public Health Assessment.

Adult swimmer&clammer and adult diver assumed to have similar soil-skin SAF as reed gatherers in Table 6-12 in EF Handbook.

Child swimmer assumed to have 50% greater soil-skin SAF than adults.

Kids in mud assumed average of kid-in-mud from Table 6-12 in EF Handbook.

2. Diver

Assume soil skin adherence factor for diver same as adult clammer.

**Factors affecting soil adherence to skin underwater is problematic depending on soil type and human activity. The factor 0.4 is same as used for average reed gatherer.

Due to the activity of "digging" and "searching" in the river bottom, a higher AF may be appropriate similar to "kids-in-mud".

Exposure frequency calculated using an average of 2 dives/year/diver in the Portland Harbor ISA.

If considering additional occupational dermal exposure from dives in areas other than ISA, the average number work-related dives/year ~~12 events~~.

Average duration per dive was 21 minutes.

| | kid-in-mud | child swimmer | Adultdiver** | adult fisher/clammer | |
|----------------------------|------------|---------------|--------------|----------------------|-------------|
| Soil skin adherence factor | 21.4 | 0.6 | 0.4 | 0.4 | mg/cm2 |
| Body surface area | 13500 | 13500 | 23000 | 23000 | cm2 |
| % of body exposed | 0.85 | 85% | 85% | 50% | % |
| exposure frequency | 4 | 24 | 2 | 52 | events/year |
| body weight | 36 | 36 | 70 | 70 | kg |

$$\text{Dose} = C \times 10^{-6} \times SA \times AF \times ABS \times EF / BW$$

Examples of data from SEDQUAL Database 2001 within 1600 meters of dive locations. Sampling 1990-1999.

| Contaminant | Ave (ppm) | ABS | Exposure Dose | |
|-------------|--------------|-----|----------------|----------------------|
| | | | Portland Diver | adult fisher/clammer |
| Total PCBs | 27.33 | 6% | 1E-06 | 2E-05 |
| Arsenic | 6.01 | 3% | 1E-07 | 2E-06 |
| Benzo(a)pyr | 111.07 | 10% | 7E-06 | 1E-04 |
| Mercury | 0.1200 | 1% | 7E-10 | 1E-08 |
| High MW PA | 3670 | 10% | 2E-04 | 3E-03 |
| Low MW PA | 4860 | 10% | 3E-04 | 5E-03 |

PCBS include Arochlor 1254 and 1260

| | | | Exposure Dose | |
|-------------|---------------------|-----|----------------|----------------------|
| Contaminant | Max (ppm) | ABS | Portland Diver | adult fisher/clammer |
| Total PCBs | 114.67 | 6% | 4E-06 | 6E-05 |
| Arsenic | 10.02 | 3% | 2E-07 | 3E-06 |
| Benzo(a)pyr | 730.00 | 10% | 4E-05 | 7E-04 |
| Mercury | 1.5100 | 1% | 9E-09 | 1E-07 |
| High MW PA | 138000 | 10% | 8E-03 | 1E-01 |
| Low MW PA | 387000 | 10% | 2E-02 | 4E-01 |

NOTES

Convert PAHS and PCBS to respective TEQs.

Joan Rothlein-CROET/OHSU